Abstract of the Disclosure

A workpiece chuck and method for supporting a workpiece such as a semiconductor wafer are described. The workpiece chuck includes an upper surface for supporting the wafer and a temperature control assembly in thermal communication with the upper surface to control temperature in the wafer. The temperature control assembly includes one or more thermoelectric modules between an upper and lower layers. One or more spacers between the upper and lower layers provide a space between the upper and lower layers such that the one or more thermoelectric modules vertically float in the space. That is, the upper and lower layers of the temperature control modules do not mechanically constrain the thermoelectric modules in the vertical direction. As a result, mechanical stresses on the thermoelectric modules due to temperature effects are substantially reduced or eliminated, resulting in much higher reliability of the chuck and the thermoelectric modules over temperature. Also, the spacers provided additional mechanical stability to the chuck, resulting in improved flatness of the chuck upper surface over temperature. To provide additional stability and improve performance over temperature, the thermoelectric modules can be made effectively smaller. This can be done by segmenting the modules into multiple segments or by providing a plurality of submodules connected together.

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